



Description of learning activity

Title of learning activity

Airtightness analysis in buildings.

The Learning activity takes place in:

CIFF Universidad Laboral Culleredo

Course/subject:

HE-VET in Energy Efficiency and Solar Thermal Energy/Energy Certification of Buildings

Topic

Duration (hours):

Airtightness and Blower Door Test

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IDENTIFICATION

Description of students:

The target students are enrolled in the second course of the Higher Education VET Cour

Learning goals: (learning outcomes?)

To learn the causes of infiltration and exfiltration in buildings envelope.
 To associate the energy losses due to the infiltration and exfiltration.
 To understand the main Phisic parameters related to the airtightness.
 To instal a Blower Door device.
 To develop a Blower Door Test.
 To interpretate the Blower Door Test results.

CONTENTS

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- 1.Common air leakage paths.
- 2.How to achieve an airtight envelope. Constructive details.
- 3.Principles of airtightness testing of dwellings.
- 4.Blower Door Test equipement. Types, parts and regulations.
- 5.Blower Door Test on the site.
- 6.Results interpretation.

SDG's :

- 4. Quality Education
- 5. Gender Equality
- 7. Affordable and clean energy
- 12. Responsible consumption and production
- 13. Climate action

How are SDG's visible and implemented in learning activity?

SDG's

4. Quality Education

Learning a system that it is becoming compulsory around EU and a good practice in the buildings construction.

5. Gender Equality

In our college, 15 out of 54 students are female this year in this course. This activity has no trouble being made for either male or female students.

7. Affordable and clean energy

Airtight buildings prevent uncontrolled losses due to the energy that is lost through infiltration and exfiltration of the thermal envelope of the buildings.

12. Responsible consumption

This activity helps students learn about losses due to air infiltration, which is not taken into account in traditional constructions but is being imposed in energy efficiency standards.

Principles

Energy Efficiency.
Airtightness in buildings. Solutions.
Blower Door Test.

Methods:

Energy losses in buildings.
Airtightness envelope criteria.
Blower Door Test installation.
Test interpretation.

Teacher's role:

The teacher will introduce the activity, giving the main guidelines and supporting those students in need of assistance throughout the process.
The teacher will do a demonstration of how to install the Blower Door Test equipment.

Student's role:

The students will follow the instructions given and will develop a plot for the whole activity that will help them succeed.

FORM

Organising:

The students will be organized into five member groups and will instal the Blower Door and proceed to the Test regarding regulations.

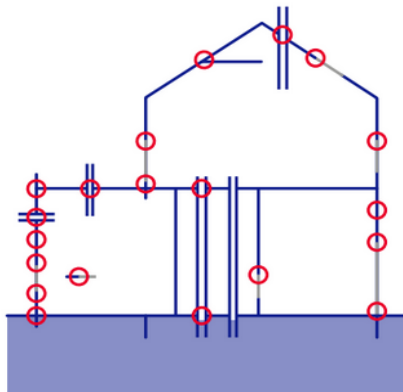
Learning environment:

The training activities begin with the explanation of the airtightness of the building envelope and the description of the installation and work process with the Blower Door.

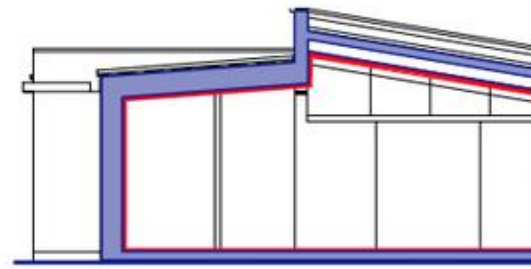
Students in groups of 3, will install the Blower Door and proceed to carry out the test in the work room.

Feedback and evaluation:

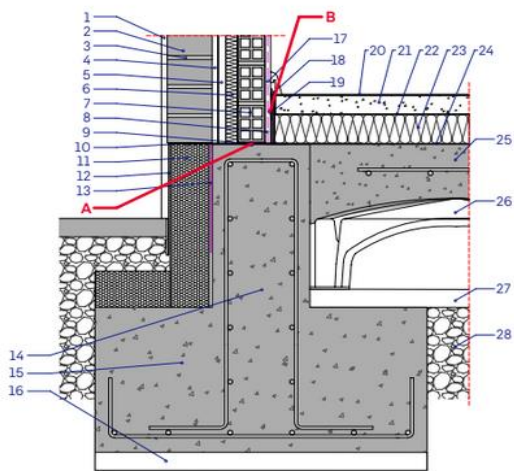
Once the tests have been carried out, they will proceed to write a report with the results obtained and the causes of these as well as the solutions to improve the results will be discussed.



Principales puntos de origen de fugas de aire.



Alzado de un edificio diseñado siguiendo "la regla del lápiz".



1. Acabado exterior
2. Ladrillo cerámico perforado
3. Cemento hidrófugo
4. Mortero hidrófugo
5. Cámara de aire
6. Aislante térmico
7. Ladrillo hueco doble
8. Revestimiento interior
9. Lecho impermeable
10. Mortero hidrófugo
11. Aislamiento resistente al agua con barrera de vapor
12. Impermeabilizante y drenaje
13. Impermeabilización de murete
14. Murete perimetral de hormigón armado
15. Zapata de cimentación en hormigón armado
16. Hormigón de limpieza
17. Lámina estanca / Línea de estanqueidad
18. Junta elástica perimetral
19. Aislante térmico perimetral
20. Pavimento
21. Recrecido de mortero
22. Geotextil
23. Aislante de poliestireno extruido
24. Geotextil
25. Capa de compresión de hormigón armado sobre forjado sanitario
26. Forjado sanitario de encofrado perdido de polipropileno
27. Capa de nivelación
28. Terreno compactado

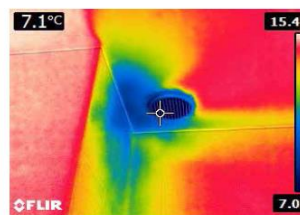
Marc puer

Cubier

Ventilad



Equipos de una Blower Door. Fuente: Retrotec.

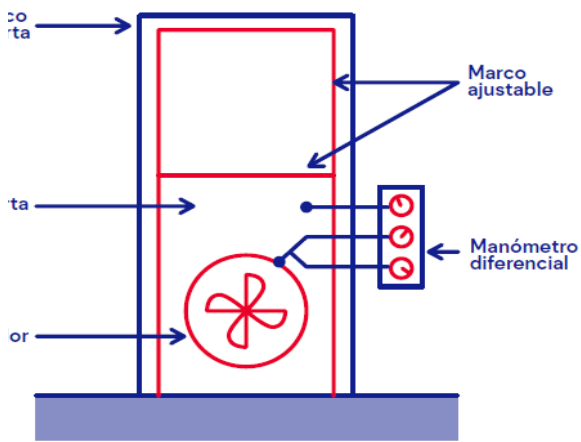
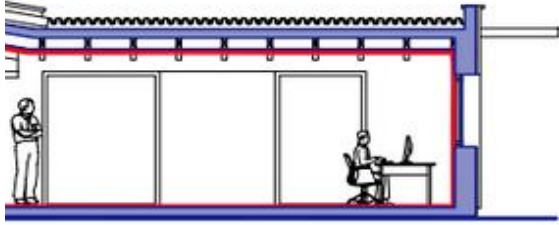


Termografía a presión normal y termografía combinada con presurización.



Camara termográfica FLIR.





Blower Door.



Aplicación de un generador de humo.



Generador de humo de Look Solutions.

